

**Amendments to the Claims**

**This listing of claims will replace all prior versions, and listings, of claims in the application:**

**Listing of Claims:**

1. (Currently amended) A method of generating authentication data for authenticating a physical object; the method comprising acts of:

measuring a property set Y of the object using a measurement procedure;

creating a property set I from the measured property set Y that meet a predetermined robustness criterion;

creating a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating acts are guided by a criteria ~~W~~;

generating a control value V in dependence on properties of the property set A; and

~~inserting the control value V and the criteria W in the authentication data; and~~

~~storing the control value V, and the criteria W and together as the generated authentication data to a storage device, wherein the criteria is not a member of property sets utilized for generating the control value V.~~

2. (Currently amended) The method as claimed in claim 1, wherein the act of creating the property set A includes performing a contracting transformation that transforms given ranges of input properties to corresponding output values guided by the criteria.

3. (Previously presented) The method as claimed in claim 2, wherein the contracting

transformation transforms a property to a binary number representative of whether the property has a positive or negative value.

4. (Currently amended) The method as claimed in claim 1, wherein the act of creating the property set A includes an act of selecting a subset of the property set I guided by the criteria.

5. (Currently amended) The method as claimed in claim 4, including an act of creating the criteria ~~W~~ for controlling the selection of the subset.

6. (Currently amended) The method as claimed in claim 5, including an act of creating ~~unique~~ criteria ~~W~~—based on respective authentication applications, wherein different respective authentication applications have different unique criteria.

7. (Previously presented) The method as described in claim 1, wherein the predetermined robustness criterion is based on a signal to noise ratio of the measured properties and the act of creating the property set I includes an act of performing a transformation  $\Gamma$  on the property set Y to create two disjunct property sets  $I_1$  and  $I_2$  where a signal to noise ratio of properties of the property set  $I_1$  are estimated to be higher than a signal to noise ratio of properties of the property set  $I_2$ ; and wherein the property set  $I_1$  is used as the property set I.

8. (Previously presented) The method as claimed in claim 7, wherein the transformation  $\Gamma$  is a linear transformation that converts a vector representing the property set Y to a vector with

components  $\alpha_i$  representing the property set I, where each vector component  $\alpha_i$  is independent of the other vector components  $\alpha_j$  ( $j \neq i$ ) and wherein the vector components are sorted according to an estimated signal to noise ratio.

9. (Previously presented) The method as claimed in claim 7, including the act of creating the transformation  $\Gamma$  in dependence on a statistical property of the measurement procedure.

10. (Previously presented) The method as claimed in claim 9, wherein the statistical property includes a covariance matrix derived from estimated properties X of the object and a corresponding statistical distribution F determined during the measuring of the property set Y.

11. (Previously presented) The method as claimed in claim 7, including an act of deriving a threshold from a noise level in the measured property set and assigning created properties with an absolute value larger than the threshold to set  $I_1$ .

12. (Previously presented) The method as claimed in claim 1, wherein the act of creating the control value V includes acts of:

converting each property of the property set A into a binary digit, and  
performing a cryptographic function on a combination of the binary digits.

13. (Previously presented) The method as claimed in claim 12, wherein the cryptographic function is a one-way function.

14. (Currently amended) A computer program stored on a computer readable memory device for generating authentication data for authenticating a physical object, the computer program being operative to cause a processor to:

measure a property set Y of the object using a measurement procedure;

create a property set I from the measured property set Y that meet a predetermined robustness criterion;

create a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating acts are guided by a criteria-W;

generate a control value V in dependence on properties of the property set A; and

~~insert the control value V and the criteria W in the authentication data; and~~

~~store the control value V, and the criteria W and together as the generated authentication data to a storage device, wherein the criteria W is not a member of property sets utilized for generating the control value V.~~

15. (Currently amended) A method of authenticating a physical object; the method comprising acts of:

measuring a property set Y of the object using a measurement procedure;

creating a property set I from the measured property set Y that meet a predetermined robustness criterion;

creating a property set A from the property set I that includes less information on the actual properties than property set Y;

generating a control value  $V'$  in dependence on properties of the property set  $A$ ,

retrieving a control value  $V$  and a criteria  ~~$W$~~  that has been generated for the physical object during an enrollment, wherein the act of retrieving comprises an act of retrieving the control value  $V$  and the criteria together from a storage device, and wherein the creating acts are guided by the  
~~criteria  $W$~~ criteria, and wherein the criteria is not a member of property sets utilized for generating the control values  $V, V'$ ; and

authenticating the physical object if there is a predetermined correspondence between the generated control value  $V'$  and the retrieved control value  $V$ .

16. (Currently amended) A computer program stored on a computer readable memory device for authenticating a physical object, the computer program being operative to cause a processor to:

measure a property set  $Y$  of the object using a measurement procedure;

create a property set  $I$  from the measured property set  $Y$  that meet a predetermined robustness criterion;

create a property set  $A$  from the property set  $I$  that includes less information on the actual properties than property set  $Y$ ;

generate a control value  $V'$  in dependence on properties of the property set  $A$ ,

retrieve a control value  $V$  and a criteria  ~~$W$~~  that has been generated for the physical object during an enrollment, wherein the control value  $V$  and the criteria are retrieved together from a storage device, wherein the creating the property set  $I$  and the property set  $A$  are guided by the  
~~criteria  $W$~~ , and wherein the criteria is not a member of property sets utilized for generating the control values  $V, V'$ ; and

authenticate the physical object if there is a predetermined correspondence between the generating a generated control value  $V'$  and the retrieved control value  $V$ .

17. (Currently amended) A system for authenticating a physical object; the system including an enrollment device, an authentication device, and a storage for storing authentication data;

the enrollment device including:

an input for receiving a property set  $Y$  of the object measured using a measurement procedure;

a processor for creating a property set  $I$  from the measured property set  $Y$  that meet a predetermined robustness criterion; creating a property set  $A$  from the property set  $I$  that includes less information on the actual properties than property set  $Y$ , wherein the creating the property set  $I$  and the property set  $A$  are guided by a criteria  $W$ ; and generating a control value  $V$  in dependence on properties of the property set  $A$  and the criteria  $W$ ; and

an output for supplying the control value  $V$  and the criteria  $W$  to the storage together as part of the authentication data; and

the authentication device including:

an input for receiving a property set  $Y'$  of the object measured using a measurement procedure and for receiving the control value  $V$  ~~from the storage including~~ and the criteria  $W$  together from the storage;

a processor for creating a property set  $I'$  from the measured property set  $Y'$  that meet a predetermined robustness criterion; for creating a property set  $A'$  from the property set  $I'$  that includes less information on the actual properties than property set  $Y'$ , wherein the creating the

property set I' and the property set A' are guided by the criteria ~~W~~; for generating a control value V' in dependence on properties of the property set A', wherein the criteria is not a member of property sets utilized for generating the control values V, V'; and for authenticating the physical object if there is a predetermined correspondence between the generated control value V' and the retrieved control value V; and

an output for issuing a signal indicating whether or not the physical object has been authenticated.

18. (Currently amended) An authentication device for authenticating a physical object, the authentication device comprising:

an input for receiving a property set Y of a physical object measured using a measurement procedure and for receiving a control value V and a criteria ~~W~~ together from a storage;

a processor for creating a property set I from the measured property set Y that meet a predetermined robustness criterion; for creating a property set A from the property set I that includes less information on the actual properties than property set Y, wherein the creating the property set I and the property set A are guided by the criteria ~~W~~; for generating a control value V' in dependence on properties of the property set A; and for authenticating the physical object if there is a predetermined correspondence between the generated control value V' and the retrieved control value V, wherein the criteria is not a member of property sets utilized for generating the control value V'; and

an output for issuing a signal indicating whether or not the physical object has been authenticated.